DEPARTMENT OF
HEALTH AND MENTAL HYGIENE
MARYLAND

Electronic Laboratory Reporting to

Maryland Department of Health and Mental Hygiene

Data Transmission Guide

Based on HL7 Standards v2.3.1 and v2.5.1

and

Code of Maryland Regulations (COMAR)

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Contents

Revision History and Contacts

Revision History			
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Document Overview

This guide provides the information required for the transmission of electronic laboratory report (ELR) to the Maryland Department of Health and Mental Hygiene (DHMH) using Health Level 7 (HL7) Standard. HL7 is an accredited, nationally recognized standard for electronic data exchange in healthcare environments. For more information on HL7, please refer to the HL7.org website.

This guide is intended for use by the person(s) responsible for transmitting their facility's laboratory information to DHMH according to the HL7 Standard. This guide will assist the person(s) responsible for locating and mapping data to the list of reportable data elements and ultimately, to the HL7 messages for transmission to DHMH.

The reportable data elements should be based on the Code of Maryland Regulations (COMAR) 10.06.01.04 Reporting Procedures, 10.18.02.06 Responsibilities of Laboratory Directors, and 26.02.01.02 Information to be Reported, all of which are available on the Office of the Secretary of State website: http://www.dsd.state.md.us/comar/comar.aspx.

It is assumed that the complete HL7 Implementation Guide has been reviewed by the reader of this document and is available as a reference document. This guide does not replace the HL7 specification and is subject to modification and/or revision to incorporate changes, improvements and enhancements, or to support additional functionality of later versions of the HL7 standard/protocol.

This guide includes the following sections:

- Electronic Laboratory Reporting (Background, Reporting Standards and Process)
- Data Transmission Protocol
- Document Conventions and Rules
- Required Data Fields (based on HL7 v2.3.1 and COMAR)
- Required Data Fields (based on HL7 v2.5.1 and COMAR)
- Appendix

Electronic Laboratory Reporting

Background

Laboratory reports are a critical component of public health surveillance. These reports are usually submitted as paper forms, voicemail, or facsimile. Public health agencies and laboratories recognize that information technology now permits this job to be performed more quickly and more efficiently. Connecting laboratories to public health agencies with automated, electronic communication will improve public health practice.[1]

The Centers for Disease Control and Prevention (CDC) initiated the National Electronic Disease Surveillance System (NEDSS) to promote the use of data and information system standards to advance the development of efficient, integrated, and interoperable surveillance systems at federal, state and local levels. It is a major component of the Public Health Information Network (PHIN).

The NEDSS initiative is designed to:

1. Detect outbreaks rapidly and to monitor the health of the nation
2. Facilitate the electronic transfer of appropriate information from clinical information systems in the health care system to public health departments
3. Reduce provider burden in the provision of information
4. Enhance both the timeliness and quality of information provided[2]

Each state and territory has legal requirements for laboratories to report certain findings to public health officials. The NEDSS Base System provides a platform to streamline the flow of reportable disease information electronically from clinical laboratories and health-care professionals to local, state, and national public health agencies.

A high-level diagram of the flow of the laboratory-reportable data based on NEDSS Systems Architecture is illustrated as follows.

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[1] Centers for Disease Control and Prevention. Electronic Reporting of Laboratory Information for Public Health. Jan 1999. Available at: http://www.cdc.gov/nedss/ELR/ELR_LabInfo_1999.pdfhttp://www.cdc.gov/nedss/ELR/ELR_LabInfo_1999.pdf. Last accessed: December 29, 2010.

[2] Centers for Disease Control and Prevention. National Electronic Disease Surveillance System. Available at: http://www.cdc.gov/nedss. Last accessed: January 3, 2011.

High-level Data Flow Diagram based on NEDSS Systems Architecture:
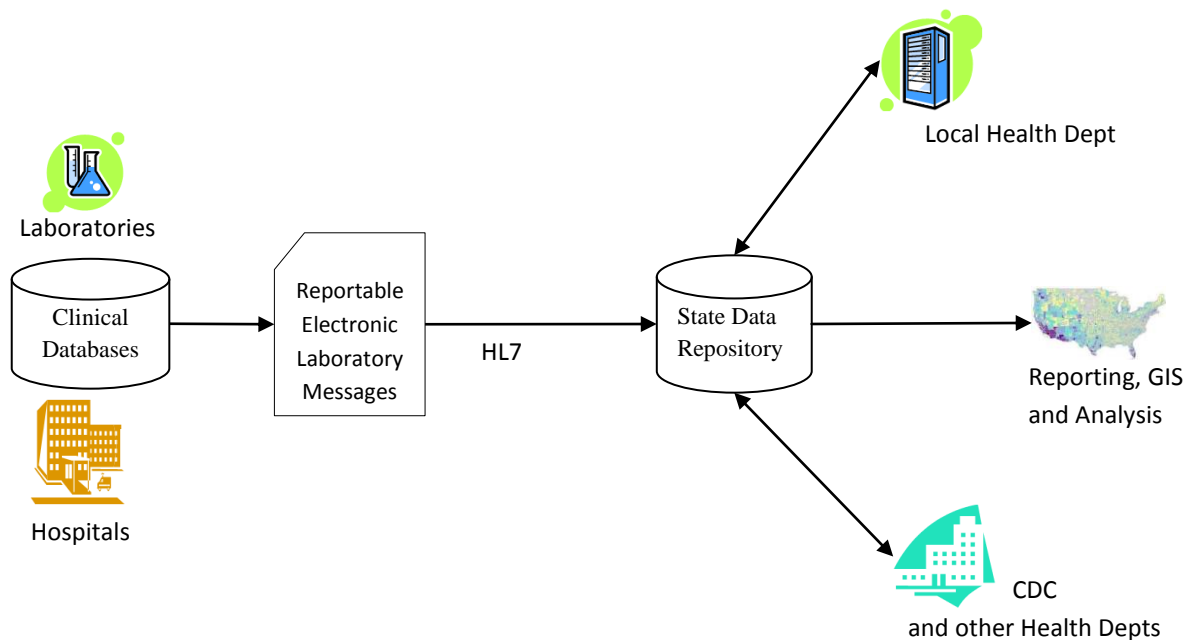
Reporting Standards

Laboratories will electronically transmit all clinical laboratory findings deemed as reportable public health information by the local (city/county), state, and national public health agencies (CDC). A list of Maryland's reportable laboratory information is available on the DHMH website http://edcp.org/html/reprtabl.cfm, which is based on COMAR 10.06.01.03 Reportable Diseases, Conditions, Outbreaks, and Unusual Manifestations; Submitting Clinical Materials.

LOINC/SNOMED

For sharing laboratory-based reports of public health findings, laboratories are highly encouraged to use the following standard coding systems for universal identification of laboratory procedures and other clinical observations:

a) Logical Observation Identifier Names and Codes (**LOINC ®**) - provides a systematic way to describe specimen type and analysis conditions and procedures that lead to a laboratory test result, and is administered by the Regenstrief Institute for Health Care.

b) Systematized Nomenclature of Human and Veterinarian MEDicine (**SNOMED®**) - provides a coding architecture for reporting disease states and laboratory testing results or organism names, and is administered by the College of American Pathologists.

LOINC and SNOMED coding systems allow for the standardized interchange of laboratory information. The LOINC and SNOMED codes remove uncertainties or ambiguities in generating the laboratory test results. Standardizing the many different ways to describe test methodology and the result produced help eliminate the interpretation of test results and enable the automation of outbreak detection and alert features.

DHMH will accept LOINC and SNOMED or local codes, though the preference is to receive LOINC and SNOMED codes and it is expected that all codes will be standardized over time.

HL7

DHMH can accept either HL7 version 2.3.1 or HL7 version 2.5.1; other HL7 versions or non-HL7 formats may be acceptable provided the required data elements (per COMAR) have been incorporated. Note that HL7 version 2.5.1 is the standard for compliance with the Centers for Medicare and Medicaid Services, Health and Human Services (HHS), meaningful use criteria for electronic submission of lab results to public health agencies.

If sending HL7 version 2.3.1, the Centers for Disease Control and Prevention's (CDC) HL7 version 2.3.1 Implementation Guide for Transmission of Laboratory-based Reporting of Public Health Information should be followed. A copy is available from the CDC website: http://www.cdc.gov/phin/library/documents/pdf/PHIN_Laboratory_Result_%20ELR_v231.pdf.

If sending HL7 version 2.5.1, the most recent version of the HL7 version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health Release 1 should be followed. This guide can be purchased from HL7.org in the HL7 Store under HL7 Standards Listed in HHS' Final Rule.

ELR Process

DHMH will need a list of test/result codes (LOINC/SNOMED or local) that the laboratory performs and will be reporting. During the testing phase, the laboratory will create ELR messages using the standard HL7 format and incorporating additional DHMH required data fields where applicable. The laboratory will transmit the data electronically using one of the secure mechanisms listed on the next page of this document (Data Transmission). DHMH will compare ELR reports with those received via traditional methods, verifying accuracy and completeness of the ELR report. This will be an iterative process until ELR reports are error-free. Traditional reporting should continue until a date is set for the discontinuation of traditional reporting.

Data Transmission

DHMH has agreed to collaborate with Maryland's Health Information Exchange, **C**hesapeake **R**egional **I**nformation **S**ystem for our **P**atients (CRISP), to receive ELR from participating facilities. More information about CRISP is available on their website: http://www.crisphealth.org. CRISP has started to work with various facilities to set up a data transfer method, and will in turn, transmit ELR (flagged as 'Reportable' by participating facilities) to the DHMH.

Facilities not yet participating in CRISP but seeking to satisfy the requirements of Meaningful Use may transmit the reportable public health information directly to DHMH using one of the following types of communication protocols:

1. Secure File Transfer Protocol (sFTP)

2. Web Services

3. PHINMS (recommended)
   Public Health Information Network Messaging System is a free software developed by the CDC to transmit public health data in a secure and automated manner over the internet. More information and specifications are available on the CDC website:
   http://www.cdc.gov/phin/activities/applications-services/phinms

The following protocols are not currently being supported by DHMH but may be supported in the future:

4. NwHIN Direct
   The Nationwide Health Information Network Direct is currently capable of supporting MU exchange for Stage 1 requirements only. More information and specifications are available on the NwHIN Direct website: http://directproject.org
   Please note that NwHIN Direct is not the same as NwHIN Exchange, which is currently limited to federal health agencies, HIEs and healthcare organizations affiliated to an HIE.

5. CONNECT

   CONNECT is an open source software that supports HIEs. The Core Services Gateway includes a feature that supports transmission of health information. More information and specifications are available on the CONNECT website: http://www.connectopensource.org

As a contingency in the event that the CRISP route is not available for any reason, CRISP-participating facilities may also use the above modalities to transmit ELR directly to DHMH or return to the traditional methods of phone or paper via fax/mail. It is recommended that CRISP-participating facilities work with DHMH to set up one of these alternative methods ahead of time.

Document Conventions

The conventions described below are used in tables throughout this document.

Column headers

SEQ = HL7 Sequence number

DT = Data Type as described by HL7 standards. Data type for each element may not match HL7 recommended data types. Possible Data Types used are:

DT ..... Date only (CCYYMMDD format)

ID ...... Coded value from HL7 recommended list

IS .... Coded value from user defined table

NM .... Numeric only

PN...... Telephone number

SI .... Sequence number

ST ...... Short Text (alphanumeric)

TS ...... Time Stamp (includes date: CCYYMMDD[hhmm [ss]] format)

TX ..... Long Text, single lines (comments)

R/O = Required/Optional characteristic. Possible values are:

R .... Element is required for a message to be sent. If a database element is required, messages will not be sent when this element has not been entered in the database.

O .... Element is optional. If this element is missing in the database, messages may still be sent.

C .... Element requirement is conditional upon other criteria. See specific Implementation Guide for details.

ELEMENT NAME = HL7 descriptive name of element in the segment
Maryland-required Fields=Data elements required to be sent per Maryland law indicated by "Yes".

General Rules

1. The term Inbound refers to data sent to DHMH; the term Outbound refers to data sent from DHMH.

2. All time values range from 0000 to 2359. The value 2400 is not used.

3. The elements listed as 'Required' are required per HL7 Implementation Guides.
   Note: *Even though some data elements are listed as Optional (O) or Required but can be left Empty (RE) in the HL7 Implementation Guides, the data elements may be required to be sent per Maryland law (indicated under the last column of the message specifications). Messages sent with such elements not present in the message will not be rejected technically by the DHMH system, nor will they be excluded from data evaluations at DHMH, however, these messages will not meet the legal requirements set forth in the Reporting Procedures of the Code of Maryland Regulations (COMAR).*

4. Laboratories may configure their systems to transmit the reportable data immediately or compile the information into a single batch for transmission at a regularly (daily) scheduled time.

Required Data Fields (based on HL7 v2.3.1 and COMAR)

The following message specifications are based on the HL7 version 2.3.1 Implementation Guide for Transmission of Laboratory-based Reporting of Public Health Information and all the DHMH required fields based on COMAR.

MSH- Message Header Segment
The MSH segment is used to define the intent, source, destination, and some specifics of the syntax of a message. This table is updated to reflect the implementation requirements specific to ELR.

MSH Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	ST	Required	Field Separator	|	The character to be used as the field separator for the rest of the message.	Yes
2	ST	Required	Encoding Characters	|^~\&|	Four characters in the following order: ^~\&	Yes
3	HD	Optional	Sending Application			
3.1	IS		Sending Application Name	Lab system name must be 13 characters or less as it is used to populate MI_Communication_function.type_cd= 'SENDER' plus the sending application name as in this field, ie. "SENDER_LABSYSTEM-LIS"		
3.2	ST		Sending Application ID			
3.3	ID		Sending Application ID Type			
4	HD	Required	Sending Facility	|Lab name^CLIA ID^CLIA|	Field that uniquely identifies the facility that sends the message.	Yes
4.1	IS		Sending Facility Name		The name of the sending facility, such as "Quest Diagnostics", "Arup Labs", etc.	Yes
4.2	ST		Sending Facility ID		The CLIA ID for the sending facility.	Yes
4.3	ID		Sending Facility ID Type	CLIA		Yes
5	HD	Required	Receiving Application	MD DOH	Expecting state postal code plus "DOH" only	Yes
5.1	IS		Receiving Application Name			
5.2	ST		Receiving Application ID			
5.3	ID		Receiving Application ID Type			
6	HD	Required	Receiving Facility	MD	Expecting 2-character state postal code only	Yes
6.1	HD		Receiving Facility Name			
6.2	ST		Receiving Facility ID			
5.3	ID		Receiving Facility ID Type			
7	TS	Required	Date/Time Of Message	yyyymmdd(hhmmss)	Required for ELR	Yes
9	CM	Required	Message Type / Trigger Event	ORU^R01	The receiving system uses this field to know the data segments to recognize and, possibly, the application to which to route this message.	Yes
10	ST	Required	Message Control ID	yyyymmdd(hhmmss)	Expecting timestamp plus lab-generated sequence number	Yes
11	PT	Required	Processing ID	Generally, 'T' Test or 'P' Production	Used to decide how to process the message as defined in HL7 processing rules.	Yes
12	VID	Required	Version ID	2.3.1	Matched by the receiving system to its own HL7 version to be sure the message will be interpreted correctly.	Yes

PID – Patient Identification Segment

Used by all applications as the primary means of communicating patient identification information. This segment contains patient identifying and demographic information that, for the most part, is not likely to change frequently. For ELR, only one PID segment is expected per message.

PID Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	SI	Optional	Set ID - PID	One PID per MSH/message; Set to '1'	The Set ID field numbers the repetitions of the PID segment (i.e., multiple patient reports). For the first occurrence of the segment, the sequence number shall be one, for the second occurrence, the sequence number shall be two, etc.	Yes
3	CX	Required	Patient Identifier List	DOCUMENT VARIANCE - please refer to HL7 v231 ELR Implementation Guide	This field contains the list of identifiers (one or more) used by the facility to uniquely identify a patient (e.g., medical record number, billing number, birth registry, etc.)	Yes
3.1			Patient ID	ID Number		Yes
3.2	CX		Check Digit			
3.3			Check Scheme			
3.4			Assigning Authority		Lab assigned to report, for example, if specimen is sent to a reference lab and they are assigned to report, the reference lab info goes here.	Yes
3.4.1			Assigning Authority Name			
3.4.2			Assigning Authority ID			
3.4.3			Assigning Authority ID Type			
3.5			ID Type Code	Type of Patient ID, for e.g.: ANON (Anonymous Identifier) MR (Medical Record Number) PI (Patient Internal Identifier) PT (Patient External Identifier) SS (Social Security Number), etc.	A code corresponding to the type of identifier. This code may be used as a qualifier to the 'Assigning authority' component.	Yes
3.6			Assigning Facility		The place or location identifier where the identifier was first assigned to the patient-part of the history of the identifier.	Yes
3.6.1			Assigning Facility Name			
3.6.2			Assigning Facility ID			
3.6.3			Assign Authority ID Type			
5	XPN	Required	Patient Name		The current, assumed legal name of the patient should be sent in this field.	Yes
5.1			Patient Last Name			Yes
5.2			Patient First Name			Yes
5.3			Patient Middle Initial / Middle Name			Yes
5.4			Patient Name Suffix	e.g. Jr, Sr, etc.		Optional
5.7			Name Type Code	L	The name type code in this field should always be "L - Legal."	Yes
7	TS	Optional	Date/Time Of Birth	yyyymmdd	Date of birth used	Yes
8	IS	Optional	Sex			Yes
10	CE	Optional	Race			Yes
10.1			Race category code	Supported- ELR values map to OMB Race Category codes in NBS		
10.2			Race Description text			
10.3			Coding system	Assumed to be HL7		
11	XAD	Optional	Patient Address	This field lists the mailing address of the patient.	This information is of great importance to public health agencies as it allows health officials to notify local agencies of potential public health problems in their jurisdictions.	Yes
11.1			Patient Street Address			Yes

11.2			Patient Address Line 2			
11.3			City			Yes
11.4			State (or Province)			Yes
11.5			ZIP / Postal Code			Yes
11.9			County (or Parish Code)			Optional
13	XTN	Optional	Phone number - home	Supported in the XTN format (not in the first field)	The patient's personal phone numbers.	Yes
13.1			Home Phone Number	Formatted phone number in this field is not accepted		Yes
13.4			Email Address			
13.6			Area Code	Expecting 3 digit area code here		Yes
13.7			Phone Number	Expecting unformatted phone number here		Yes
13.8			Extension			
14	XTN	Optional	Phone Number-Business			
16	CE	Optional	Marital Status			
18	CX	Optional	Patient account number	See PID-3		
19	ST	Backward Compatibility	SSN number - patient	see PID-3	This field has been retained for backward compatibility only. It is recommended to use PID-3-patient identifier list for all patient identifiers.	Yes
22	CE	Optional	Ethnic Group		This field further defines patient ancestry.	Yes
29	TS	Optional	Patient death date and time			
30	ID	Optional	Patient death indicator			

NK1 – Next of Kin/Associated Parties Segment

The NK1 contains information about the patient's next of kin, emergency contact, or other associated or related parties. At this time, only one NK1 is supported; additional NK1 segments will be skipped. The NK1 is an optional segment.

NK1 Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	SI	Required	Set ID - NK1	NK1 is created regardless of whether any Contact info was present		Yes
2	XPN	Optional	Next of Kin/Emergency Contact Name			Yes
2.1			Next of Kin Last Name			
2.2			Next of Kin First Name			
2.3			Next of Kin Middle Name			
3	CE	Optional	Relationship	These come from HL7 table 0063. If no relationship is available to pass here, the generic relationship 'NOK' is mapped.		Yes
4	XAD	Optional	Address			Yes
4.1			NOK/ EC Street Address			
4.2			NOK/ EC Address Line 2			
4.3			NOK/ EC City			
4.4			NOK/ EC State			
4.5			NOK/ EC ZIP			
4.9			NOK/ EC County			

5	XTN	Optional	Phone number			Yes
5.1			Home Phone Number	Formatted phone number in this field is not accepted		
5.4			Email Address			
5.6			Area Code	Expecting 3 digit area code here		
5.7			Phone Number	Expectig unformatted phone number here		
5.8			Extension			

ORC – Common Order Segment

The ORC is used to transmit fields that are common to all orders (all types of services that are requested). Since the Ordering Provider address or the Ordering Facility information are required for the ELR message, the ORC is a required segment.

ORC Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
21	XON	Optional	Ordering Facility Name		Need either an Ordering Provider or an Ordering Facility in the message for it to be migrated to NBS; preferably both are present.	Yes
21.1	ST		Organization Name			
21.2	IS		Organization Name Type Code			
21.3		NM	ID Number	None expected/ none mapped		
22	XAD	Optional	Ordering Facility Address		This field contains the address of the facility placing the order.	Yes
22.1			Facility Street Address			Yes
22.2			Facility Address Line 2			
22.3			Facility City			Yes
22.4			Facility State (or Province)			Yes
22.5			Facility ZIP/Postal Code			Yes
22.9			County			
23	XTN	Optional	Ordering Facility Phone Number		This field contains the telephone number of the facility placing the order.	Yes
23.1			Home Phone Number	Formatted phone number in this field is **not** accepted		
23.6			Area Code	Expecting 3 digit area code here		Yes
23.7			Phone Number	Expecting unformatted phone number here		Yes
23.8			Extension			
24	XAD	Optional	Ordering Provider Address		This field contains the address of the care provider requesting the order.	Yes
24.1			Ordering Provider Street Address			Yes
24.3			Ordering Provider City			Yes
24.4			Ordering Provider State (or Province)			Yes
24.5			Ordering Provider Zip Or Postal Code			Yes
24.9			County			

OBR- Observation Request Segment

The OBR segment is used to transmit information specific to an order for a diagnostic study or observation, physical exam, or assessment. The OBR defines the attributes of a particular request for diagnostic services or clinical observations. For laboratory-based reporting, the OBR defines the attributes of the original request for laboratory testing. Essentially, the OBR describes a battery or panel of tests that is being requested or reported. The OBR is somewhat analogous to a generic lab slip that is filled out when physician requests a lab test.

OBR Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	SI	Optional	Set ID - OBR		One OBR segment for each test ordered. Each OBR segment can be followed by multiple OBX segments.	Yes
3	EI	Required	Filler Order Number +		For laboratory based reporting, this field will be used to report the laboratory specimen accession number.	Yes
3.1	ST		Entity identifier			
3.2	IS		Namespace ID			
3.3	ST		Universal ID			
3.4	ID		Universal ID Type			
4	CE	Required	Universal Service ID	Required to provide either 4.1-4.3, 4.4-4.6, or 4.1-4.6	This field is the identifier code for the requested observation/test/battery.	Yes
4.1	ST		Code (LOINC)		LOINC code	Yes
4.2	ST		Description (LOINC)		LOINC description	Yes
4.3	ST		ID Type (LOINC)	LN		Yes
4.4	ST		Code (Local)		Local code	Yes
4.5	ST		Description (Local)		Local description	Yes
4.6	ST		ID Type (Local)	L		Yes
7	TS	Required	Observation Date/Time	*yyyymmdd(hhmmss)*	This field shall represent the date and time the specimen was collected or obtained, and is required for results reporting.	Yes
8	TS	Optional	Observation End date/Time #	Supported is sent but not generally used with PH ELR		
9	CQ	Optional	Collection Volume	Supported is sent but not generally used with PH ELR		
13	ST	Optional	Relevant Clinical Info		Optional text input supported	Optional
14	TS	Conditional	Specimen Received Date/Time	*yyyymmdd(hhmmss)*	Required for ELR. The specimen received date/time is the actual login time at the diagnostic service. This field must contain a value when the order is accompanied by a specimen, or when the observation required a specimen and the message is a report.	Yes
15	CM	Optional	Specimen Source		This field identifies the site where the specimen should be obtained.	Yes
15.1			Specimen Source Name or Code		Specimen source name or code, e.g. blood culture - heart blood.	Yes
15.1.1	CE		Identifier		E.g. BLDV or STL	Yes
15.1.2	ST		Text		E.g. Blood venous or Stool	Yes
15.1.3	ST		Name of Coding System	HL70070	Assumed to be HL7 - no place to store in ODS if other system	Yes
15.2	TX		Additives			
15.3	TX		Free Text			
15.4	CE		Body Site			Yes
15.4.1	ST		Identifier			
15.4.2	ST		Text			
15.5	CE		Site modifier			
15.5.1	ST		Identifier			

15.5.2	St		Text			
15.5.3	ST		Name od Coding system	Assumed to be HL7- no place to store in ODS if other system		
16	XCN	Optional	Ordering Provider		This field identifies the provider who ordered the test. This field is optional only if the Ordering Facility information is provided in the message.	Yes
16.1	ST		Ordering Provider ID			Yes
16.2	ST		Provider Last Name			Yes
16.3	ST		Provider First Name			Yes
16.8			Name Type Code			Yes
17	XTN	Optional	Order Callback Phone Number		This field is the telephone number for reporting a status or a result using the standard format with extension and/or beeper number when applicable. This field is optional only if the Ordering Facility's phone number is provided in the message.	Yes
17.6			Area Code	Expecting 3 digit area code here		Yes
17.7			Phone Number	Expecting unformatted phone number here (7 digits)		Yes
17.8			Extension			
22	TS	Conditional	Results Rpt/Status Chng-Date/Time	For ELR, the actual report time is pulled from OBX-14, Date/time of the Observation.		Yes
25	ID	Required	Result Status	E.g. P for Preliminary, F for Final results, or C for Correction to results, etc.	This field is the status of results for this order.	Yes
26	CM	Optional	Parent	Used for Micros; for e.g. the name of the organism (previously identified) on which sensitivities were performed.	For ELR, all of the CE data type components of field OBX-5 from the previous parent message appear in this field of the present OBR, using subcomponent delimiters.	Required for antimicrobial susceptibility testing results.
26.1	CE		OBX-3 Observation Identifier		The code for a microbial culture that appeared in a previous OBX-3.	Required for antimicrobial susceptibility testing results.
26.1.1	ST		Identifier		The code for a microbial culture that appeared in a previous OBX-3.	Required for antimicrobial susceptibility testing results.
26.1.2	ST		Text	E.g. Microorganism identified	The text describing the code.	Required for antimicrobial susceptibility testing results.
26.1.3	TX		Name of Coding System	Eg. L or LN	Assumed to be HL7	Required for antimicrobial susceptibility testing results.
26.2	ST		OBX-4 sub-id of parent result			Required for antimicrobial susceptibility testing results.
26.3	TX		Part of OBX-5 observation result from parent			Required for antimicrobial susceptibility testing results.
31	CE	Optional	Reason For Study	Supported as ICD codes	For public health reporting, ICD-9-CM codes used to support testing and reimbursement should be used here. This field can repeat to accommodate multiple diagnoses.	Optional
32	CM	Optional	Principal Result Interpreter +	Supported byt not sent		

OBX- Observation/Result Segment

The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest individual unit or a report. Its principal mission is to carry information about observations in report messages. While OBR gives general information about the order for the test and ORV gives information on all services that re requested, the OBX segment gives the specific, individual tests performed and the specific results for each test. Laboratory-based reporting to public health agencies focuses on OBX-3 and OBX-5 as the most informative elements of the message; this, every effort should be made to make OBC-3 and OBX-5 as informative and unambiguous as possible.

OBX Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	SI	Required	Set ID - OBX	This field can be used to track a number of results within one test panel.	This field contains the sequence number. There can be many OBX's per OBR.	Yes
2	ID	Conditional	Value Type	SN, CE, TX, or ST	Defines the format of the observation value in OBX-5. The **CE** and **SN** data types should be used whenever possible.	Conditional
3	CE	Required	Observation Identifier	For reporting of laboratory results, OBX-3 is the specific test that has been performed.	This field contains a unique identifier for the result being reported. Required to provide either 3.1-3.3, 3.4-3.6, or 3.1-3.6	Yes
3.1			Identifier Code	LOINC Code		Conditional
3.2			Text	LOINC Description		Conditional
3.3			Name of Coding System	LN		Conditional
3.4			Alternate Identifier	Local code here		Conditional
3.5			Text	Local description here		Conditional
3.6			Alternate Coding System	L		Conditional
4	ST	Conditional	Observation sub-ID	Used for processing but not mapped	This field is used to distinguish between multiple OBX segments with the same observation ID organized under one OBR.	Conditional
5	Variable	Conditional	Observation Value *	If CE data type in OBX-2, prefer SNOMED result code. **For SN data in this field, the length is 9(11,5) for each numeric value. For TX or ST data in this field, the length is 2000.	Required to provide a result in OBX5.	Yes
5.1			Result Code (SNOMED)	SNOMED Code	If CE in OBX2, SnoMed code	Conditional
5.2			Result Text (SNOMED)	SNOMED Description	If CE in OBX2, SnoMed description	Conditional
5.3			ID Type (SNOMED)	SNM		Conditional
5.4			Alt Result Code (Local)	Local code here	If CE in OBX2, Local code	Conditional
5.5			Alt Description (Local)	Local description here	If CE in OBX2, Local description	Conditional
5.6			Alt ID Type (Local)	L		Conditional
6	CE	Optional	Units	ISO unit codes, e.g. ug/mL	This field contains the units for the observation value in OBX-5. Typically only use OBX 6.1.	Yes
7	ST	Optional	Reference Ranges	Associated with SN and CE results		Yes
8	ID	Optional	Abnormal Flags		This field contains the microbiology sensitivity interpretations. Values for sensitivity data are S, I or R. When findings other than susceptibility results are sent, the abnormal flag should be valued (e.g., "H", "N", or "A") to distinguish between tests that are interpreted as normal and those that are interpreted as abnormal.	Yes
11	ID	Required	Observation Result Status		This field reflects the current completion status of the results for data contained in the OBX-5-observation value field. It is a required field.	Yes
14	TS	Required	Date/Time Of The Observation	*yyyymmdd(hhmmss)*	The date/time when the result was read by the laboratory.	Yes
15	CE	Optional	Producer's ID		Contains a unique identifier of the responsible producing service. It should be included for all ELR messages that are reported to public health agencies.	Yes

15.1	ST		Identifier		The CLIA ID for the lab that performed the test.	Yes
15.2	ST		Text		The name of the lab that performed the test.	Yes
15.3	ST		Name of Coding System	CLIA		Yes
17	CE	Optional	Observation Method		This field is used to transmit the method or procedure by which an observation was obtained when the sending system wishes to distinguish among one measurement obtained by different methods and the distinction is not implicit in the test ID.	Yes
17.1	ST		Identifier			
17.2	ST		Text			
17.3	ST		Name od Coding System			

NTE- Notes and Comments Segment

NTE is a common format for sending notes and comments. This optional, repeating segment may be inserted after any of the OBX segments in the ORU message. The NTE segment applies to the information in the segment that immediately precedes it, i.e., the observation reported in the preceding OBX segment. The NTE segment is not further defined by HL7.

NTE Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	SI	Optional	Set ID - NTE			Yes
3	FT	Optional	Comment		If interpretive information is placed in the note field then it should be included	Yes

FHS- File Header Segment

FHS is used to head a file (group of batches).

FHS Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	ST	Required	File field separator			
2	ST	Required	File Encoding characters			
3	ST	Optional	File sending application			
4	ST	Optional	File Sending Facility			
6	ST	Optional	File receiving facility			
7	TS	Optional	File creation date/time			

BHS- Batch Header Segment

BHS is used to define the start of a batch of ORU Unsolicited Laboratory Result messages being sent from a Laboratory to a specific state

BHS Seq	HL7 Data Type	HL7 R/O (PHIN Usage)	HL7 Element Name	ELR Usage (Default Value)	Comments	Maryland-Required Fields
1	ST	Required	Batch field separator			
2	ST	Required	Batch encoding characters			
4	ST	Optional	Batch Sending Facility			
6	ST	Optional	Batch receiving facility			
7	TS	Optional	Batch creation date/time			

Required Data Fields (based on HL7 v2.5.1 and COMAR)

The following is a list of all the DHMH required fields based on COMAR cross-walked to elements from HL7 version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health Release 1. Note that this is only a minimal list of required fields and the full Implementation Guide with all the other required elements should be followed.

Segment	Seq	Element Name	Maryland-required Fields
PID	3	Patient Identifier List	AIDS and STD programs require both Medical Record Number and last 4 digits of Social Security Number
	5	Patient Name	Yes
	7	Date/Time Of Birth	Yes
	8	Administrative Sex	Yes
	10	Race	Yes
	11	Patient Address	Yes
	13	Phone Number - Home	Yes
	22	Ethnic Group	Yes
ORC	12	Ordering Provider	Yes
	14	Call Back Phone Number	Yes
	21	Ordering Facility Name	Yes
	22	Ordering Facility Address	Yes
	23	Ordering Facility Phone Number	Yes
	24	Ordering Provider Address	Yes
OBR	7	Observation Date/Time	Yes
	16	Ordering Provider	Yes
	17	Order Callback Phone Number	Yes
	22	Results Rpt/Status Chng - Date/Time	Yes
	25	Result Status	Yes
OBX	5	Observation Value	Yes
	6	Units	Yes
	7	References Range	Yes
	11	Observation Result Status	Yes
	14	Date/Time of the Observation	Yes
	23	Performing Organization Name	Yes
	24	Performing Organization Address	Yes
SPM	4	Specimen Type	Yes
	10	Specimen Collection Site	Yes
	17	Specimen Collection Date/Time	Yes
	18	Specimen Received Date/Time	Yes